



Upper Chickahominy River TMDL First Public Meeting for Biological Impairment

June 7, 2012

Species sensitive to pollution:



Stonefly Larvae



Caddisfly Larvae



Beetle Larvae



Hellgrammite



Mayfly Larvae

Species less sensitive to pollution:



Aquatic Worms



Blackfly Larvae

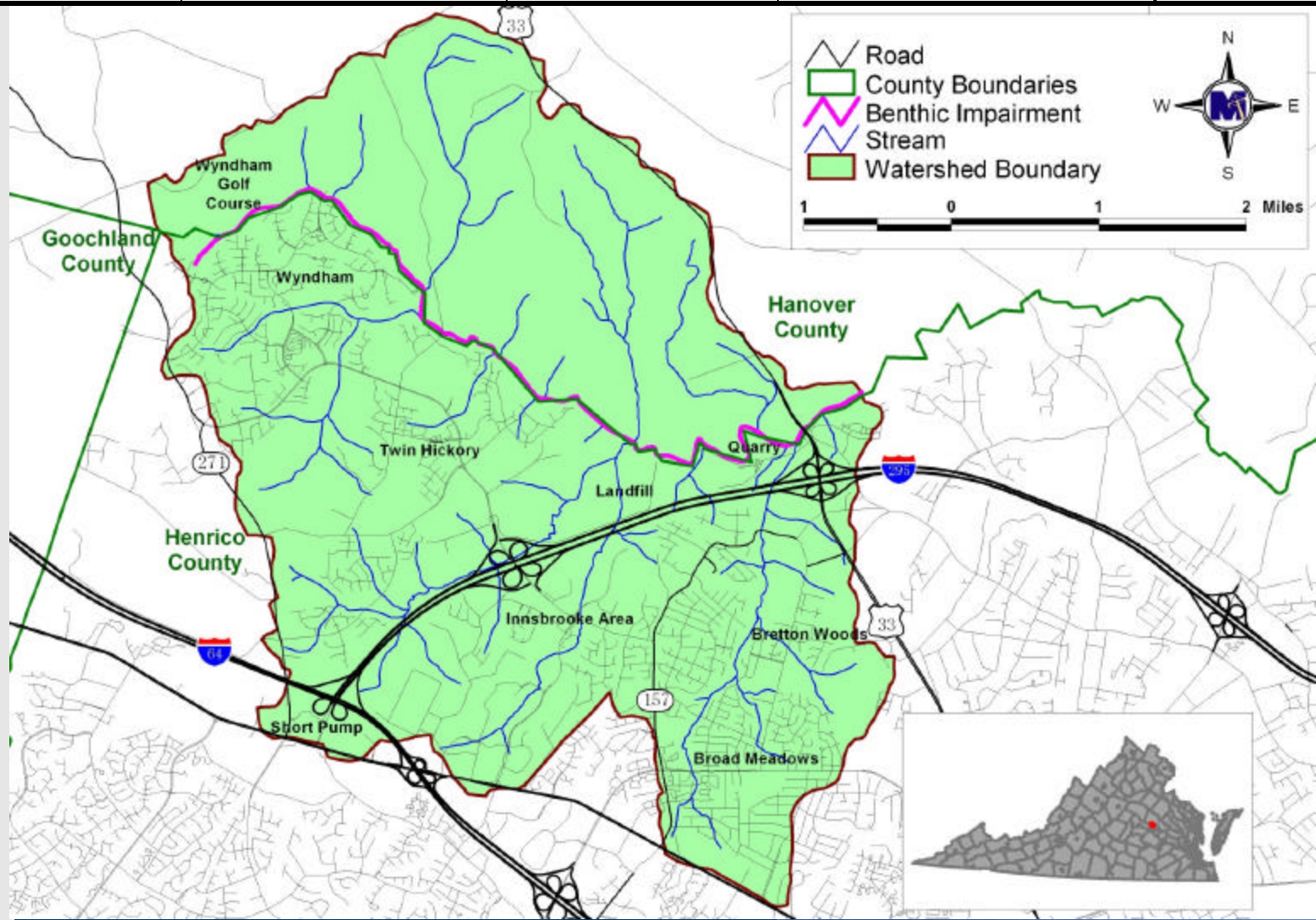


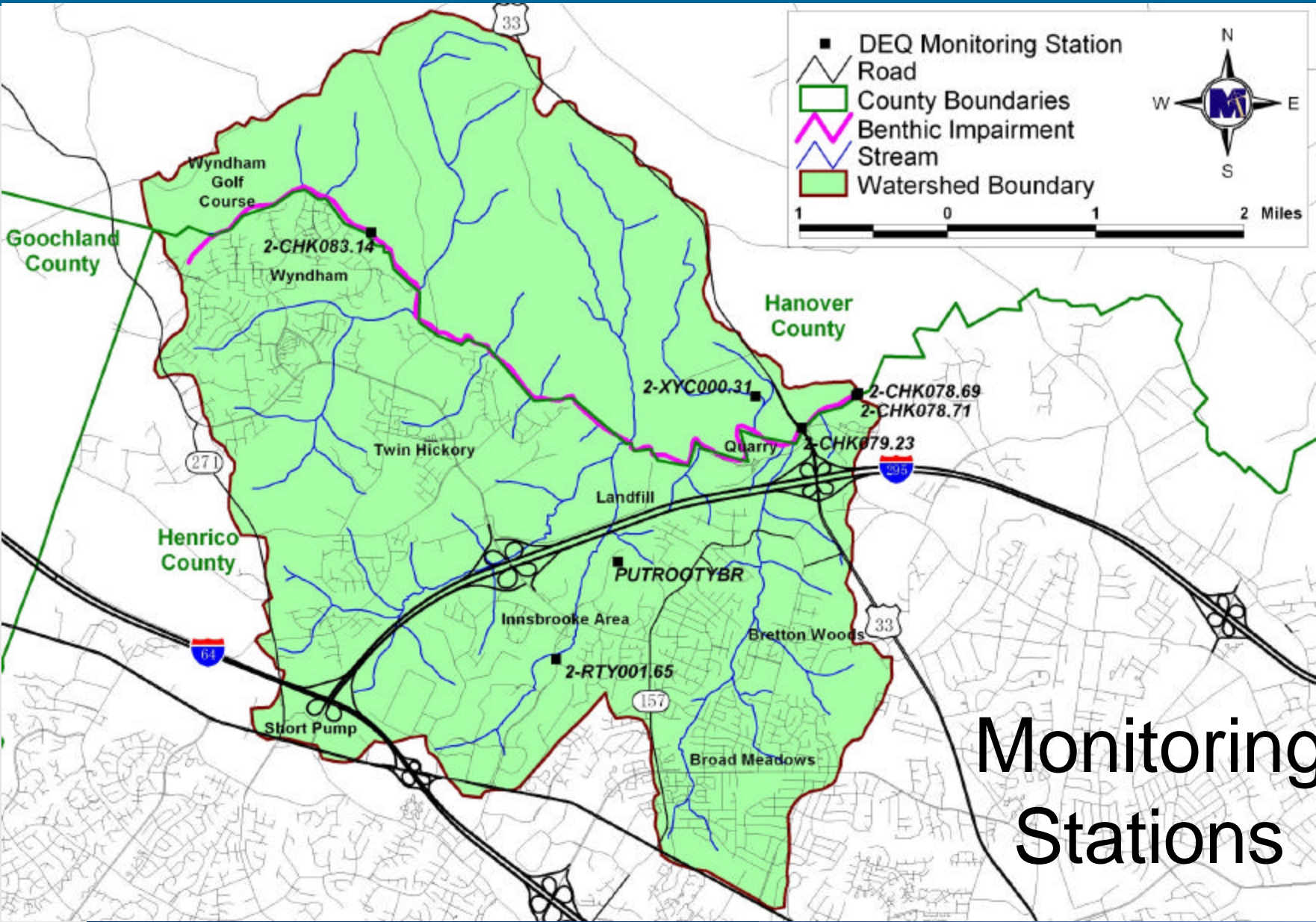
Midge (Blood Worm) Larvae

Biological (Benthic) Impairment

- VA Stream Condition Index (VASCI)
 - Standardized sample collection and analysis methodology
 - Multimetric
 - Rating Scale

Stream Name	Impairment ID	Initial Listing Year	Impairment Location	Drainage Area
Chickahominy River	VAP-G05R_CHK01A00	2010	Headwaters to Trib XDD (7.06 stream miles)	~14,000 Acres





Monitoring Stations

Chickahominy Benthic Data

Station Name	Date	Sample Season	VASCI
2-CHK079.23 at Rt 33 Bridge	09/29/08	Fall 2008	40.61
	06/01/10	Spring 2010	25.15
	11/12/10	Fall 2010	46.25

A VASCI score <60 indicates an impaired benthic community

VSCI consistently < 60

VASCI = Virginia Stream Condition Index

Data Summary For 2-CHK079.23

June 2001 – November 2011

<u>Water Quality Constituent</u>	<u>Count</u>	<u>Average</u>	<u>Max</u>	<u>Min</u>	<u>Standard or Screening Value</u>
*Dissolved Oxygen, mg/L	39	8	13.3	3.8	4.0 (min)
*Field pH (std units)	40	6.7	7.2	5.2	6.0 to 9.0
Temp Celsius	40	15.6	26.3	1.2	31.0 (max)
*Phosphorus, Total (mg/L As P)	38	0.06	0.22	0.02	0.2 (max)

Values observed outside
of standard or screening
value

Data Summary For 2-CHK079.23

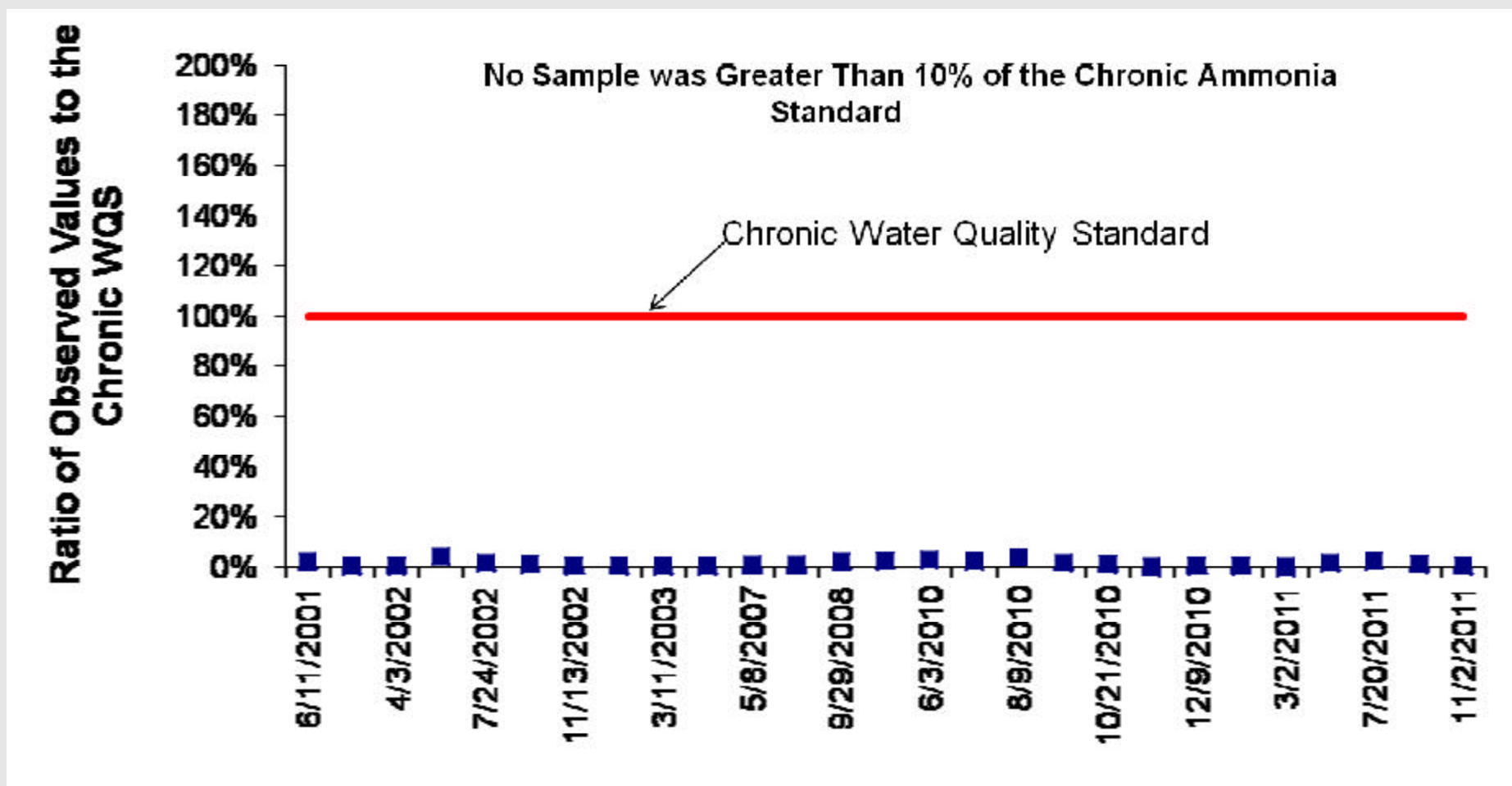
June 2001 – November 2011

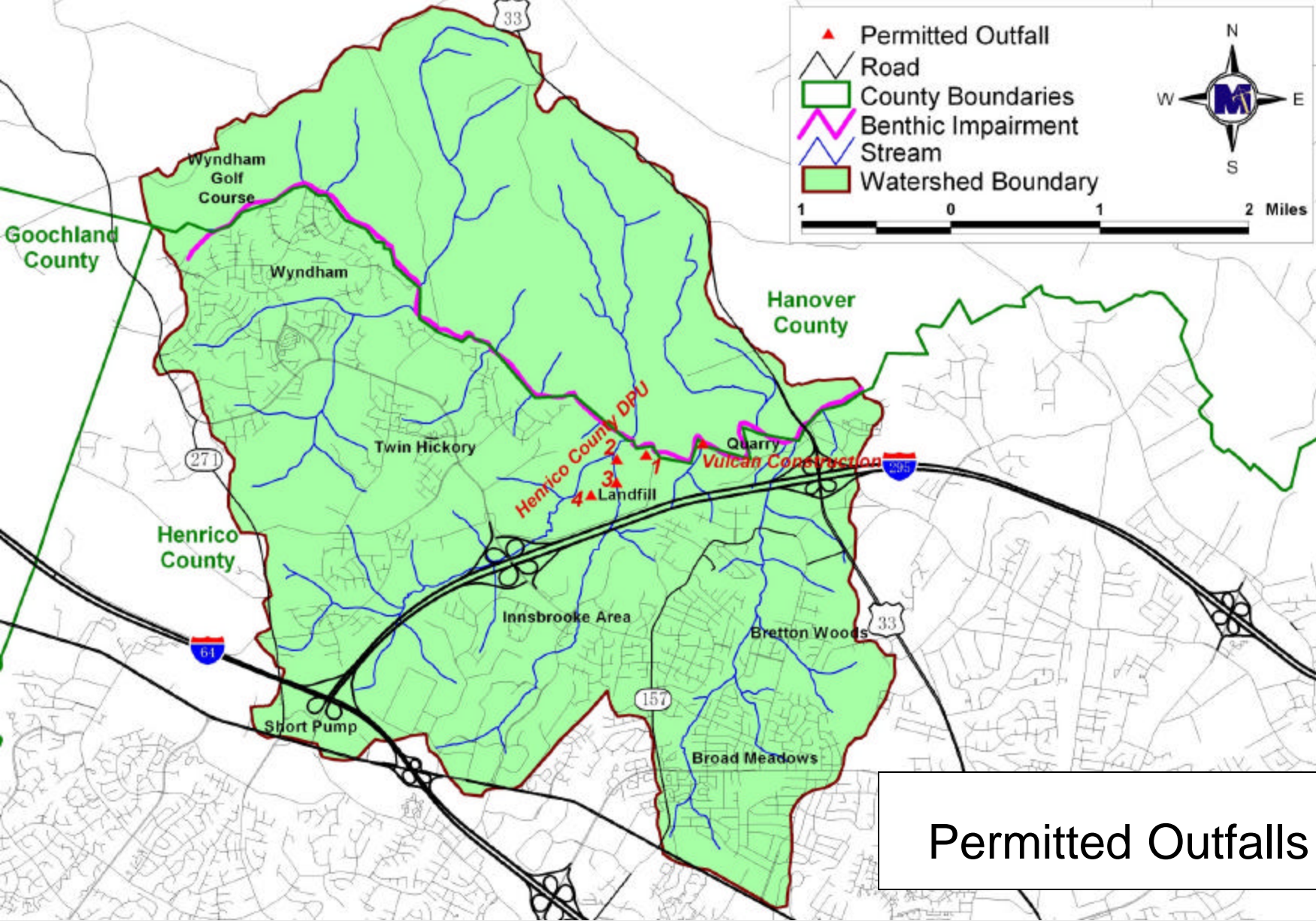
Water Quality Constituent	Count	Average	Maximum	Minimum
*BOD ₅ (mg/L)	11	4.2	11	2
Conductivity (µmhos/cm)	40	197	433	84
Hardness (mg/L As CaCO ₃)	13	30.6	48.1	10.8
Nitrate Nitrogen (mg/L as N)	31	0.4	1.8	0.03
Nitrogen, Kjeldahl, Total, (mg/L As N)	26	0.7	1.2	0.3
Phosphorus (Total Ortho P, mg/L)	25	0.03	0.07	0.02
Total Inorganic Solids (mg/L)	11	119.9	220	76
Total Inorganic Suspended Solids (mg/L)	23	5.6	19	1
Total Organic Solids (mg/L)	11	39.1	70	17
Total Solids (mg/L)	12	157.2	260	119
Total Suspended Organic Solids (mg/L)	16	2.3	5	1
Total Suspended Solids (TSS) (mg/L)	36	6.8	23	2

*Biochemical Oxygen Demand

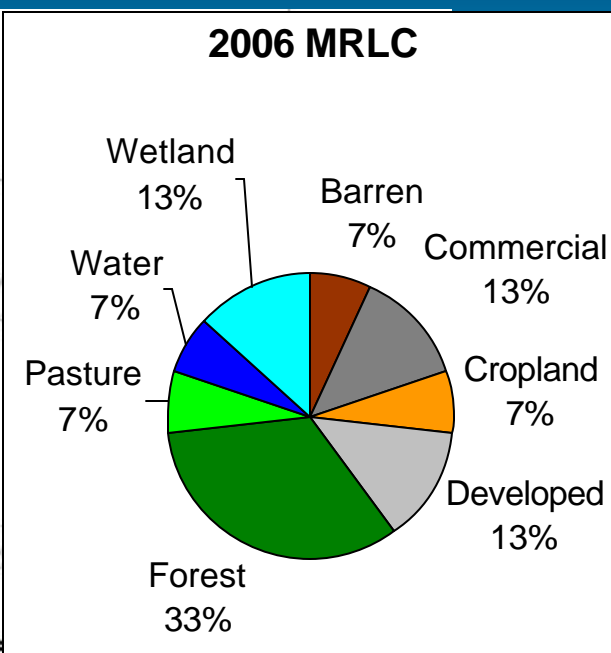
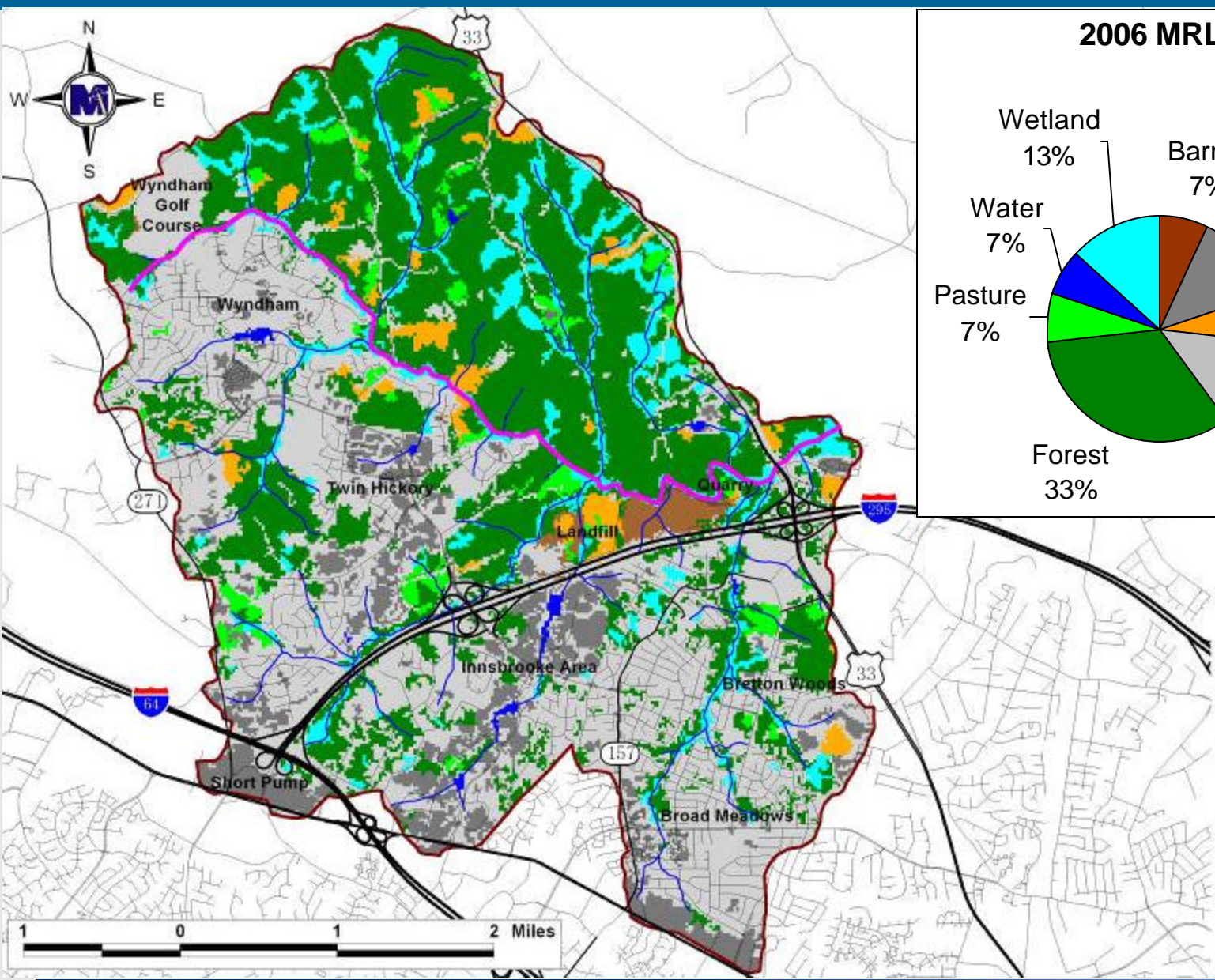
No “official” standard or screening value for these constituents

Ammonia at 2-CHK079.23

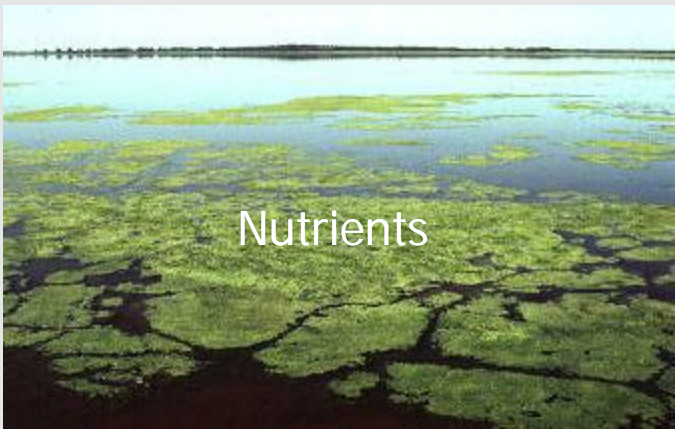
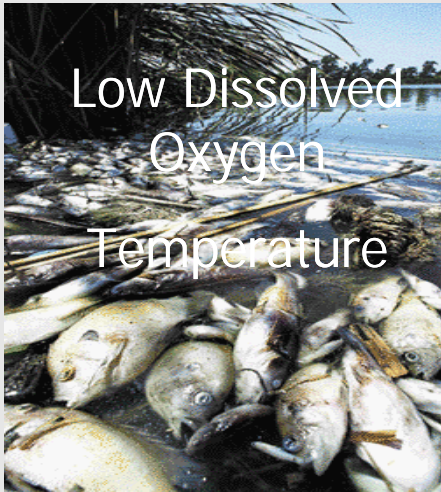




Permitted Outfalls



Upper Chickahominy River: What is harming the Aquatic Life?



Chickahominy River at Rt 33 Bridge (May 2012)



How do we Determine the TMDLs?



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Watershed data



TMDL



- Conduct the Analyses
- Public Meeting 2 (Fall 2012)
- Public Review
- Submit to EPA
- State Approval
- Implementation Plan Development
- Implementation





We appreciate that you're taking the time to come to the meeting!

We appreciate your feedback – comment period ends July 9, 2012!

Contact Information

**Send written comments to Margaret by July 9, 2012
via mail, email or fax**

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Extra Slides

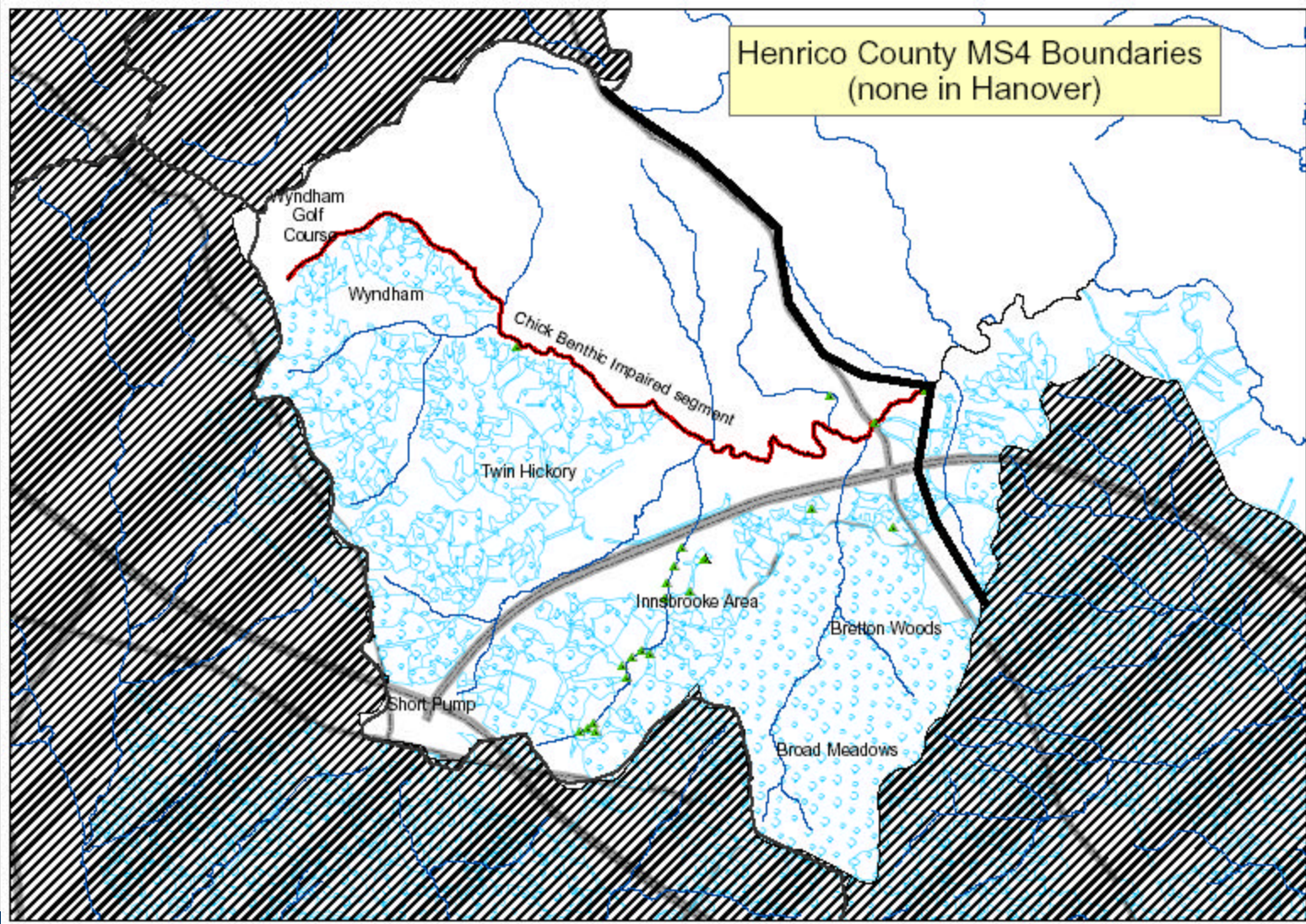
Modeling – Sediment

- Rainfall-Runoff-Water Quality
 - Generalized Watershed Loading Function (GWLF)
 - ◆ Watershed-based
 - ◆ Daily Flow and Sediment output

Permitted Facilities

Permit No	Facility Name	Limits	Outfall Number	Outfall Source	Design Flow(MGD)	Receiving Stream	River Mile
VA0058041	Vulcan Construction Materials LP - Springfield	Flow, pH, BOD5, TSS, total P, NH3- as N, Settleable Solids	001	Quarry activities stormwater, groundwater, overflow/run-off from reuse activities (0.27) Ready-mix concrete (0.0012) The maximum, monthly average flow is 0.56 MGD as reported on DMRs	1.2	Chickahominy River	2-CHK080.63
VAR051025	Henrico County DPU Springfield Rd Waste Management	TSS	001	Land-based runoff	use hydrology model	Chickahominy River	NULL
		TSS	002			Allen's Branch	NULL
		TSS	003			Rooty Branch	NULL
		pH, BOD5, TSS, Zn, NH3- as N, Alpha-Terpineol, Benzoic Acid, Phenol, P-Cresol	004			Allens Branch	NULL
VA0088617	Henrico County MS4	--	Many	Land-based runoff	use hydrology model	Many	NULL

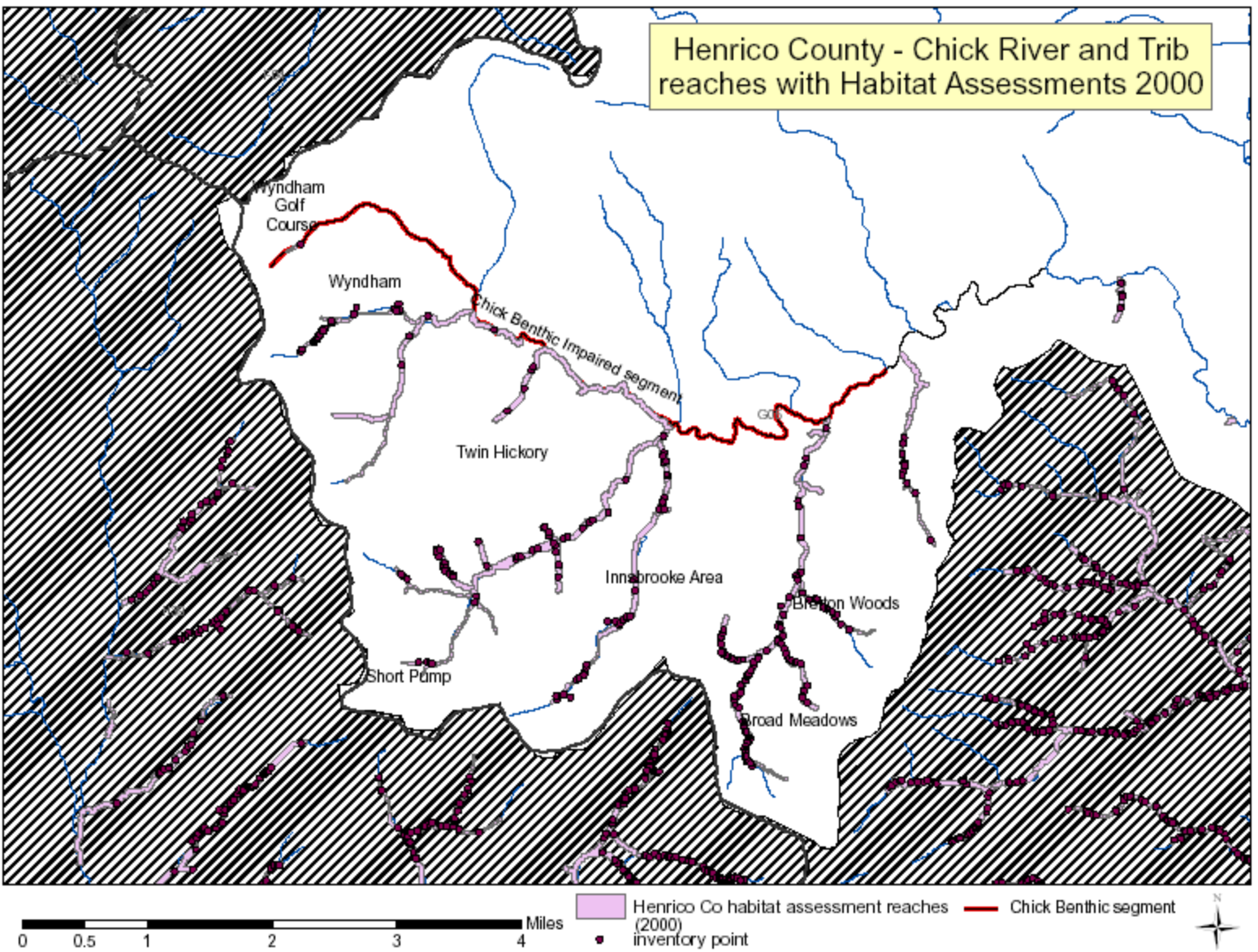
Henrico County MS4 #VA0088617



Permit DMRs

(TSS) Vulcan Construction Materials LP - Springfield #:VA0058041		
Permit Monthly Avg limit 5 mg/L Permit Monthly Maximum 7.5 mg/L		
Conc Avg (Monthly)	Conc Max (Monthly)	Due Date
21.2	21.2	10-Sep-00
6.0	6.0	10-Apr-02
6.1	6.1	10-Jan-03
4.7	7.6	10-May-03
8.4	8.4	10-Aug-04
8.4	8.7	10-Aug-05
13.4	16.2	10-Dec-05
5.8	8.6	10-Mar-06
9.1	37.7	10-Feb-07
3.9	16.0	10-Apr-07
5.9	5.9	10-May-07
6.0	8.0	10-Jul-11

Henrico Co. Habitat Assessment Reaches and Inventory Points



Sediment Metal Results at 2-CHK083.14

<u>Metal</u>	<u>PEC¹</u>	<u>Value</u>
Arsenic	33	1.8
Cadmium	4.98	0.06
Chromium	111	4
Copper	149	10.7
Lead	128	11.1
Mercury	1.06	0.01
Nickel	49.6	2
Zinc	459	13

Values observed
well below PEC

¹ PEC: Probable Effect Concentration

Sediment Pesticide Results at 2-CHK083.14

<u>Pesticide</u>	<u>PEC¹</u>	<u>Value</u>
Total Chlordane	17.6	0.21
DDE	31.3	0.4
DDD	28	0.81
Total DDT	572	1.76
Total polybrominated diphenyl ether congeners	NA	0.23
Octachlorodibenzodioxin	NA	1.46

Values observed well below PEC

¹ PEC: Probable Effect Concentration

Benthic Habitat Data From 2-CHK079.23

9/29/2008

HabSamplID	HabParameter	HabValue	Comments
CHK12997	ALTER	18	
CHK12997	BANKS	12	
CHK12997	BANKVEG	14	
CHK12997	FLOW	15	
CHK12997	POOLSUB	12	
CHK12997	POOLVAR	14	
CHK12997	RIPVEG	15	
CHK12997	SEDIMENT	9	
CHK12997	SINUOSITY	9	
CHK12997	SUBSTRATE	11	

**For any Habitat Metric the best possible
score is 20**

Benthic Habitat Data From 2-CHK079.23

Collected 6/1/2010

HabSampleID	HabParameter	HabValue	Comments
CHK392	ALTER	17	
CHK392	BANKS	15	
CHK392	BANKVEG	14	
CHK392	FLOW	13	
CHK392	POOLSUB	12	
CHK392	POOLVAR	16	
CHK392	RIPVEG	16	
CHK392	SEDIMENT	12	
CHK392	SINUOSITY	10	
CHK392	SUBSTRATE	12	

**For any Habitat Metric the best possible
score is 20**

Benthic Habitat Data From 2-CHK079.23

Collected 11/12/2010

HabSampID	HabParameter	HabValue	Comments
CHK531	ALTER	16	
CHK531	BANKS	10	
CHK531	BANKVEG	12	
CHK531	FLOW	14	
CHK531	POOLSUB	12	
CHK531	POOLVAR	16	
CHK531	RIPVEG	17	
CHK531	SEDIMENT	9	
CHK531	SINUOSITY	10	
CHK531	SUBSTRATE	14	

**For any Habitat Metric the best possible
score is 20**